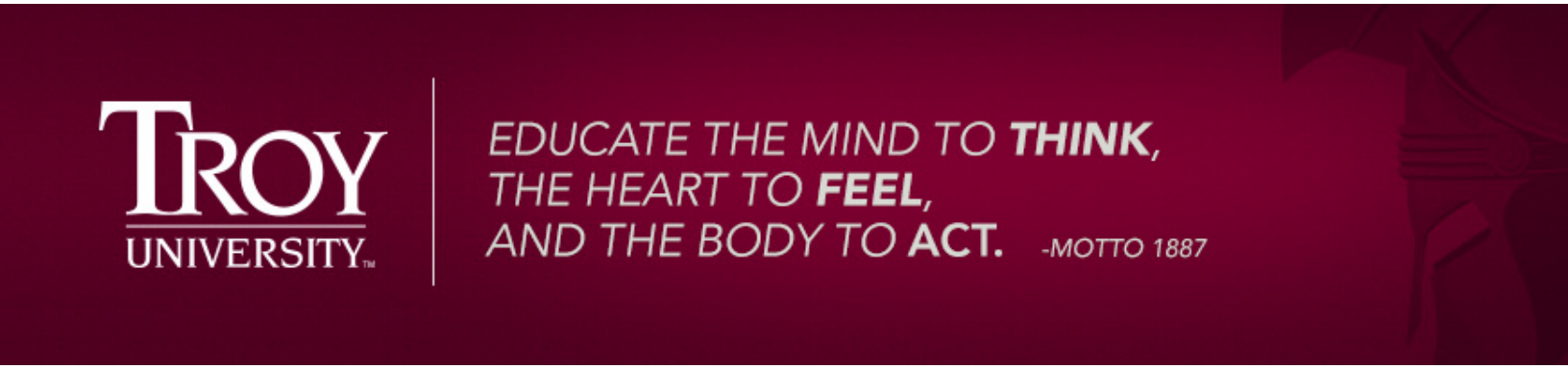
Course Syllabus



CS2220 Numerical Methods in Computing

Spring 2026

3/2/2026 - 6/19/2026

Current Fly-in lectures schedule: 5/18-29

Instructor Information

Name: **Dr. Bernard Chen**
Phone: (334) 808-6239
Email: chenb@troy.edu (mailto:chenb@troy.edu)

Current Fly-in lectures schedule: 5/18-29

Office Hours: 327 MSCX Building on Monday 10am~noon, Wednesday 10am~noon and Friday 10am~noon. I am available to chat or meet on MS Teams during my office hours, however I would prefer that you email me for an appointment.

Course Description

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Introduces a broad range of mathematical problems and their applications in scientific computing using various numerical computation techniques with Python. Topics include but are not limited to numerical analysis, floating point arithmetic, computational algebra, the iterative solution to nonlinear equations, and interpolation. (Prerequisite: MTH 1112)

Course Objectives and outcomes

After successful completion of this course, the student should have the ability to:
1. write a solution to the various numerical problems in Python.
2. describe the problems and solutions of the linear algebra and systems of linear equations.
3. describe Eigenvalues and Eigenvectors and related numerical problems and solutions.
4. describe the least squares regression concepts and solve related problems.
5. solve the problems related to Taylor series, root finding and numerical differentiation.

Entrance Competencies/Course Prerequisites/Course Co-requisites

Prerequisite: MTH 1112

Required Textbooks & Supplementary Materials

Required Textbooks:

Python Programming And Numerical Methods: A Guide For Engineers And Scientists

https://pythonnumericalmethods.studentorg.berkeley.edu/notebooks/Index.html (https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fpythonnumericalmethods.studentorg.berkeley.edu%2Fnotebooks%2FIndex.html&data=05%7C0

Required Textbook and Materials

This course is part of our course material delivery program, Trojan Book Bag. The bookstore will provide each student with a convenient package containing all required physical materials and all digitally delivered materials for this course will be integrated into Canvas.

You should have received an email from the bookstore confirming materials provided for each of your courses and asking you to select how you would like to receive any printed components (in-store pick up or home delivery). If you have not done so already, please confirm your fulfillment preference so the bookstore can prepare your materials.

For more information about Trojan Book Bag, please go here (https://nam11.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.troy.edu%2Facademics%2Facademic-resources%2Ftrojan-book-bag.html&data=05%7C02%7Cmmauldin%40troy.edu%7C47084843572b4047efec08dcf8567a6a%7C8de80de86d8a47cb

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Additional Information

To access digitally delivered materials within Canvas, please click on the Trojan Book Bag link in the navigation menu.

Method of Evaluation

Topics, Reading Assignments, Homework Weeks, Exam Dates
This is tentative and subject to change at the discretion of the professor.

1. Python Basics
2. Variables and Basic Data Structures
3. Functions
4. Branching Statements
5. Iterations
6. Recursion
7. Object-Oriented Programming
8. Representation of Numbers
9. Reading and Writing Data
10. Visualization and Plotting
11. Linear Algebra and Systems of Linear Equations
12. Eigenvalues and Eigenvectors
13. Least Squares Regression
14. Interpolation
15. Taylor Series
16. Root Finding
17. Numerical Differentiation

Grading Policy

Program assignments
Code Development 25% (compile w/o error)
Program Execution 25% (run successfully)
Program Design 20% (conform to spec)
Documentation 20% (program, comments)
Coding Style 10% (clear, efficient)

Course Grade

Mid-term Exam 25%
Final Exam 35%
Programming Project Assignments 25%
Programming Test 15%

Letter Grade Scale

A 90 ~ 100
B 80 ~ 89
C 70 ~ 79

D 60 ~ 69
F 0 ~ 59

Policies

Plagiarism/Artificial Intelligence (AI) Policy

Plagiarism (https://my.troy.edu/online/assets/documents/Plagiarism.pdf)

Attendance Policy

In addition to interaction via Canvas and email contact, you are required to contact the instructor via email or telephone by the first day of the term for an initial briefing. Although physical class meetings are not part of this course, participation in all interactive, learning activities is required.

Make-Up Work Policy

Missing any part of this schedule may prevent completion of the course. If you foresee difficulty of any type (e.g., an illness, employment change, etc.) which may prevent completion of this course, notify the instructor as soon as possible. Failure to do so will result in failure for an assignment and/or failure of the course. If I have not heard from you by the deadline dates for assignments, exams, or forums, no make-up work will be allowed (unless extraordinary circumstances exist, such as hospitalization). Requests for extensions must be made in advance and accompanied by appropriate written documentation. “Computer problems” is not an acceptable excuse.

Late Registration

Students who register during the first week of the term, during late registration, will already be one week behind. Students who fall into this category are expected to catch up with all of Week #1 and Week #2's work by the end of Week #2. No exceptions, since two weeks constitutes a significant percentage of the term's lessons. Students who do not feel they can meet this deadline should not enroll in the class. If they have registered, they should see their registrar, academic adviser, GoArmyEd or Military Education officer to discuss their options. Also note that late registration may mean you do not receive your book in time to make up the work you missed in Week #1. Not having your book on the first day of class is not an excuse for late work after the deadlines in the Course Schedule.

All other TROY Online Policies and Procedures are listed under the Home Page Tab.

Disability Services/ADA

Disability Services provides assistance and accommodations to students with documented disabilities that may impede their academic progress. Services include notifying instructors about the specific accommodations to which the student is entitled. Disability Services will not alter the academic requirements of individual courses.

Each student must provide recent documentation of his or her disability in order to participate.

For more information about Disability Services in Troy University (e.g. how to apply, Troy University policies, documentation guidelines and contact information), click on this **Disability Services Link (https://my.troy.edu/student-disability-services/)** .

Additional Course Information

Please insert any additional course information (research components, student expectations, requirements, etc).

Course Summary:

Date	Details	Due
Mon Mar 9, 2026	**Week1 assignment (https://troy.instructure.com/courses/115770/assignments/1984336)**	due by 11:59am
Mon Mar 16, 2026	**Week2 assignment (https://troy.instructure.com/courses/115770/assignments/1987148)**	due by 11:59am
Mon Mar 23, 2026	**Week3 assignment (https://troy.instructure.com/courses/115770/assignments/1990805)**	due by 11:59am
Mon Mar 30, 2026	**Week4 assignment (https://troy.instructure.com/courses/115770/assignments/1996900)**	due by 11:59am
Mon Apr 6, 2026	**Week5 assignment (https://troy.instructure.com/courses/115770/assignments/1998330)**	due by 11:59am
Mon Apr 13, 2026	**Week6 assignment (https://troy.instructure.com/courses/115770/assignments/1999076)**	due by 11:59am
Mon Apr 20, 2026	**Week7 assignment (https://troy.instructure.com/courses/115770/assignments/2000574)**	due by 11:59am
Mon Apr 27, 2026	**Week8 assignment (https://troy.instructure.com/courses/115770/assignments/2001916)**	due by 11:59am

Date	Details	Due
Mon May 4, 2026	Week9 assignment (https://troy.instructure.com/courses/115770/assignments/2004059)	due by 11:59am
Mon May 11, 2026	Week10 assignment (https://troy.instructure.com/courses/115770/assignments/2005602)	due by 11:59am
Mon May 18, 2026	5/18 assignment (https://troy.instructure.com/courses/115770/assignments/2012123)	due by 3pm
Tue May 19, 2026	5/19 assignment (https://troy.instructure.com/courses/115770/assignments/2012766)	due by 3pm
Wed May 20, 2026	Programming Exam (https://troy.instructure.com/courses/115770/assignments/2014578)	due by 3pm
Thu May 21, 2026	5/20 take home assignment (https://troy.instructure.com/courses/115770/assignments/2014574)	due by 1pm
	BlackJack (https://troy.instructure.com/courses/115770/assignments/2016021)	due by 3pm
Fri May 22, 2026	Midterm (https://troy.instructure.com/courses/115770/assignments/2014579)	due by 3:30pm
Tue May 26, 2026	5/26 class assignment (https://troy.instructure.com/courses/115770/assignments/2019266)	due by 3pm
Wed May 27, 2026	5/27 class assignment (https://troy.instructure.com/courses/115770/assignments/2019611)	due by 3pm
Thu May 28, 2026	5/28 class assignment (https://troy.instructure.com/courses/115770/assignments/2019955)	due by 3pm
Fri May 29, 2026	Final Exam (https://troy.instructure.com/courses/115770/assignments/2019959)	due by 3pm

Date	Details	Due
Thu Jun 4, 2026	**Final Project (https://troy.instructure.com/courses/115770/assignments/2019954)**	due by 3pm
	5/25 class assignment (https://troy.instructure.com/courses/115770/assignments/2019142)	